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ABSTRACT

After assessing its programs and teacher education research, it was decided by the Peabody College of Vanderbilt University that the ultimate goal of the programs would be to develop teachers who would be problem solvers who were able to assess each unique classroom situation and select from alternative strategies the strategy that is the "best fit." Using four phases of problem-solving: (1) understanding; (2) planning; (3) carrying out the plans; and (4) looking back, changes were made in the teacher education program. This report describes each of these phases, listing the objectives as developed and the research findings to be utilized with each one. Some of the objectives are clustered as they relate to one another. To better clarify the utility of the research findings in carrying out the objectives, direct quotes from significant research studies are provided. In discussing the implementation phase of this program development, descriptions are given of a series of videotapes of classroom scenes that were used prior to the time when preservice students went into classes for practicum experiences. A discussion is presented on the importance of the "looking back" phase in problem solving, which offers an opportunity to reflect, evaluate and generalize both the problem and the solution, and relates the problem to others that incorporate it into the repertoire of solved problems. References are included and a sample practicum observation form is appended. (JD)

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HOW DO WE PREPARE TEACHERS? USING RESEARCH PROBLEM SOLVING AND TECHNOLOGY TO IMPROVE TEACHER EDUCATION

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Criticism of the way in which teachers are prepared has been widespread over the past few years. Major reports including A Nation at Risk, Carnegie Forum on Education and the Economy A Nation Prepared: Teachers for the 21st Century and the Holmes Group Tomorrow's Teachers suggest that colleges and universities have failed to provide the education that school teachers need.

"The demands for reform of teacher education have come in many shapes and sizes but there appear to be seven general themes that cover most of the proposals for change;

1. Various measures of intellectual capability and academic achievement should be used to control entry to teacher education and to teaching so as to increase the quality of the teaching corps.

2. Prospective teachers should have a strong grounding in the liberal arts and should have substantial coursework in the subjects they teach. Students who want to teach in high schools, and perhaps all teachers, should major in an academic subject.

3. Professional education courses should be more sophisticated and more demanding. In particular, courses dealing with teaching methods should incorporate the findings of recent research.

4. Preservice teacher education should be extended to one full year of coursework beyond the time the person receives the bachelor's degree. Some such proposals urge that teacher preparation stretch over the given year period and others argue that teacher education should not commence until after undergraduate work has been completed.

5. Professional education should involve more field experiences and semester-long practice teaching experiences.

6. States should develop ways to secure teacher certification that would not require attendance in conventional preparation programs. These"alternative certification" paths would seek to attract to teaching persons of exceptional talent.

7. Induction programs for first year teachers or special schools for teacher training within public school systems should be developed in order to ensure that new teachers are able to put into effect and build upon what they learn about 'teaching in college (Austin, Goldman and Hawley, forthcoming)."

Even before the above mentioned reports were forthcoming, the Department of Teaching and Learning of Peabody College of Vanderbilt University had begun to assess its teacher preparation programs to determine how effective they were in preparing preservice teachers to meet the challenges in today's classrooms. After carefully assessing the programs and the teacher education research, it was decided that the ultimate goal of the programs would be to develop teachers who would be problem solvers - able to assess each unique classroom situation and select from alternative strategies the strategy that is the "best fit."

The elementary/early childhood program at Peabody was the first program to be adjusted. A project designed to strengthen field experiences for these students was begun in the fall of 1985.

Just as the expectation for students of Vanderbilt's undergraduate teacher education program is to develop as "problem solvers" in the classroom, the faculty has approached its tasks for program improvement utilizing a problem solving model.

Using Polya's (1957) four phases of problem solving: understanding, planning, carrying out the plan, and looking back, the faculty has made changes in the teacher preparation program.

Understanding Phase

This phase of Polya's model encompasses both problem recognition and problem representation. Lester (1985) suggests that expert problem solvers spend considerably more time than novices in analyzing and developing meaningful representations of problems before acting. The faculty spent considerable time identifying and defining the problem areas of the current undergraduate education program.

Numerous sources were used in determining the problem area or areas for growth to be addressed for possible change. During fall semester 1985, the elementary and early childhood student teachers' assessment data were compiled. Eight informal evaluations per student were conducted (total of 80 observations) during the initial student teaching placement. These narrative evaluations were reviewed and common problems were noted. General findings indicated problems with lesson transitions, lesson flow, awareness of the total class, and adjusting lessons when needed.

Formal evaluations made by the University supervisors and cooperating teachers were used in determining additional growth areas. These evaluations indicated that overall improvement was needed in questioning, making modification in instruction, and making and stating rules.

Through videotapes and performance in field experiences, practica students from fall semester 1985 provided further data. Analysis of these sources indicated general areas of growth needed in seatwork assignment, behavior toward high and low achieving students, reacting to student responses, uses of punishment, student responsibilities, and flow of lessons. In reviewing the research on beginning teachers

(Veenman, 1984), many of the perceived problems were similar to those noted in our investigation.

Our Advisory Committee composed of researchers and practitioners and our Field Support Team composed of teachers from the local area schools who work with our preservice teachers either in practicum situations or student teaching assisted us in reviewing the research related to the previously identified problems and developing the laboratory experiences to hopefully alleviate those problems.

Planning Phase

This phase of the problem solving model is what Polya identifies as the strategy selection stage. During a series of seminars with the faculty and staff, the Field Support Team analyzed the problem areas of our preservice student teachers and assisted in the development of a series of objectives, that if achieved by the student teachers, should improve the problem areas. They also discussed the research and selected that which should be utilized with the preservice student teachers.

Following are listed the objectives as developed and the research findings to be utilized with each one. Some of the objectives are clustered as they relate to one another.

OBJECTIVE: The preservice student teacher develops awareness of the class by:

- recognizing off-task behavior
- having an awareness of pupils in all sections of the room
- developing ways of addressing all pupils

OBJECTIVE: The preservice student teacher is able to design and teach lessons which flow smoothly by:

- pacing the lessons
- integrating content and management
- progressing the lesson logically
- justifying the time spent on each aspect of the lesson
- introducing the lesson effectively
- providing appropriate closure
- making smooth transitions to the next activity
- giving the pupils transition signals
- dealing with interruptions in a manner that minimizes the loss of instructional time

Research Findings Indicate:

Monitoring of the classroom by the teacher includes three dimensions:

1.) Teachers watch groups, and what is happening in the entire room.

2.) Teachers watch conduct/behavior of students and particularly notice behavior that does not meet expectations. "Withit" teachers stop misbehavior early.

3.) Teachers monitor the pace, rhythm, and duration of classroom events. Smoothness and momentum characterize more effective lessons while hesitations and lags increase off-task behavior. (Doyle, 1986, p. 414)

". . .there is a tension between the goal of maximum content coverage by pacing the students through the curriculum as rapidly as possible and the needs to: a) move in small steps so that each new objective can be learned readily and without frustration; b) see that students practice the new learning until they achieve consolidated mastery marked by smooth and correct responses; and c) where necessary, see that the students learn to integrate the new learning with other concepts and skills and to apply it efficiently in problem-solving situations." (Brophy & Good, 1986, p. 361)

"The pace at which the class can move will depend on the students' abilities and developmental levels, the nature of the subject matter, the student-teacher ratio, and the teacher's managerial and instructional skills." (Brophy & Good, 1986, p. 361)

"Students achieve more in classes where they spend most of their time being taught or supervised by their teachers rather than working on their own (or not working at all)." (Brophy & Good, 1986, p. 361)

"Achievement is maximized when teachers not only actively present material, but structure it by beginning with overviews . . . and reviewing main ideas at the end. Organizing concepts and analogies helps learners link the new to the already familiar. Summary reviews integrate and reinforce the learning of major points." (Brophy & Good, 1986, p. 362)

"We would encourage teachers to evaluate their own instructional practices according to certain general criteria for looking at task and evaluation

structures. What opportunities do low achievers have for success in classrooms? If they do succeed, do their classmates have a chance to see and evaluate that success? Does every child know clearly what he has done that is successful and what needs to be improved? Are competitive marks and grades the only basis children have for knowing how well they are performing? Do classroom tasks and objectives provide multiple dimensions of competence? Is reading a prerequisite for successful participation on all "important" tasks? How often does the teacher use multimedia tasks and small groups? Do the better readers dominate the interaction of task groups?" (Rosenholtz & Cohen, 1983, p. 526)

OBJECTIVE: The preservice student teacher develops the ability to state and use rules in the classroom by:

- knowing a variety of ways of developing rules
- monitoring the rules and the consistency with which they are enforced
- making pupils aware of rules
- using a variety of strategies to deal with disruptive pupil behavior

OBJECTIVE: The preservice student teacher develops an awareness of the uses of punishment by:

- using it with a consistency when it is used
- emphasizing its appropriateness (not using academic tasks, not embarrassing pupils)
- knowing that it should not waste class time nor interrupt the

lesson

- making decisions and providing follow-up
- acknowledging that personal emotions must be removed as much as possible from the situation

Research Findings Indicate:

"The teacher . . . is expected to elicit work from students. Students in all subjects and activities must engage in directed activities which are believed to produce learning. Their behavior, in short, should be purposeful, normatively controlled and steady. . ." (Lortie, 1975, p. 151)

". . . it seems to us that adequate management of the classroom environment also forms a necessary condition for cognitive learnings; and if the teacher cannot solve problems in this sphere, we can give the rest of teaching away." (Dunkin and Biddle, 1974, p. 135)

"Learning is also dependent on variation in the use of authority in the classroom. There appear to be some classrooms where control of behavior is so much more important a goal than substantive learning." (Cohen, 1972, p. 449)

"Better organized teachers were able to see through the eyes of their students in planning the classroom and in introducing the students to new routines during the year. They appeared to predict what would confuse or distract their students and what would be of immediate concern to them." (Evertson and Emmer, 1982, p. 8)

"Better managers were more explicit about what was desirable behavior." (Evertson and Emmer, 1982, p. 9)

". . .rules need to be clearly stated and understood and the penalties clearly indicated for violating them." (Rich, 1984, p. 110)

"Analyzing classroom tasks. Better managers demonstrated the ability to analyze the tasks of the first few weeks of school in precise detail. Their presentations to the students about rules, procedures, and assignments were very clear, and they provided specific feedback to students when inappropriate behavior occurred." (Evertson and Emmer, 1982, p. 8)

"It is important for students to understand why the rule was established and why it is necessary to comply with it." (Rich, 1984, p. 110)

"Teaching the going-to-school skills. Better managers incorporated the teaching of rules and procedures as a very important part of instruction during the first few weeks. That is, they taught going- to-school skills by providing practice and moving through procedures, giving feedback, responding to signals, and pointing out to students when they are behaving appropriately." (Evertson and Emmer, 1982, p. 8)

"This critical management task is far more complex than simply stating several rules about conduct. Although such rules can be useful, establishing clear expectations requires more time and effort because desirable behaviors frequently vary according to the classroom activity. For example, activities such as seatwork, small-group work, and whole-class instruction require very different student behaviors. Seatwork requires that students be able to work independently, follow directions, get

help when they are unable to work on their own, and know what to do if they complete their seatwork. Whole-class instruction requires students to sit and listen to the teacher or other students, answer questions when asked, wait their turn to respond, and, frequently, raise their hands when they wish to volunteer a response or ask a question. Thus, stating a few rules for behavior will not be sufficient to guide student behavior during such disparate activities.

Because students are not automatically aware of, nor do they practice the behavior appropriate for an activity, it is the teacher's responsibility to know what the necessary behaviors are and to communicate them to the students." (Evertson and Emmer, 1982, p. 11)

"Planning consequences enables the teacher to encourage appropriate behavior from the beginning of the year and to be in a position to act promptly to deal with inappropriate behavior when it occurs." (Evertson and Emmer, 1982, p. 20)

". . .if the classroom is not rule-governed, the teacher may be inconsistent in administering punishment by either imposing a particular punishment one day for a misbehavior and ignoring it the next or deviating in the penalty chosen for the same infraction." (Rich, 1984, p. 110)

"In the use of punishment, teachers want to avoid inculcating feelings of failure and inadequacy. One way these feelings may likely be avoided is by students understanding rules and participating in their formulation." (Rich, 1984, p. 111)

OBJECTIVE: The preservice student teacher uses his/her personality effectively in the classroom by:

- assuming a "teacher presence" in the classroom
- showing enthusiasm for teaching and children
- using a variety of expressions and voice inflections
- making use of non-verbal expressions
- being sensitive
- dressing professionally

OBJECTIVE: The preservice student teacher reacts to student responses after:

- listening actively
- talking with students, not at them
- talking with different grade levels with appropriate language
- considering academic as well as social problems

Research Findings Indicate:

"Effective management consists of those teacher behaviors that produce high levels of student involvement in classroom activities and minimize student behaviors that interfere with the teacher's or other students' work and efficient use of instructional time." (Evertson and Emmer, 1982, p. 6)

". . . teachers affect students through what they say, how they question, how they explain, and through the use of curriculum materials." (Cohen, 1972, p. 444)

"effective teachers appear to be those who are, shall we say, 'human' in the fullest sense of the word. They have a sense of humor, are fair, empathetic, more democratic than autocratic, and apparently are more able to relate easily and naturally to students either on a one-to-one or group basis. Their classrooms seem to reflect miniature enterprise operations in the sense that they are more open, spontaneous, and adaptable to change." (Hamachek, 1969, pp. 341-342)

". . . what we need first of all are flexible, 'total' teachers who are (as) capable of planning around people as they are around ideas." (Hamachek, 1969, p. 344)

"Student attitudes were linked most closely to measures of teacher warmth and student orientation: praise, use of student ideas, willingness to listen to students and respect their contributions, and socializing with students in addition to instructing them." (Brophy & Good, 1986, p. 369)

OBJECTIVE: The preservice student teacher develops an awareness of the ways homework and seatwork can be used effectively by:

- insisting on quality
- monitoring the appropriateness of the work in relation to what has been taught and the independent instructional level of the pupil
- offering a variety in assignments
- regulating the amount of work
- giving complete directions
- evaluating and monitoring assignments

Research Findings Indicate:

"The amount of student learning is influenced not only by the amount of engaged time (time when student is paying attention), but also by the "match" between the task and the particular student." (Fisher, Marliave, & Filby, 1977, p. 52)

"To foster cognitive achievement, it is important for the teacher to know the cognitive skills and level of performance of individual students." (Fisher, et al., 1981, p. 10)

"In both reading and math, students tend to make fewer errors on daily tasks when teachers spend more time structuring the lesson and giving directions. It seems critical that students understand what they are supposed to do so that they can respond correctly." (Fisher, et al., 1981, p. 11)

". . . it is a good idea to monitor seatwork by going around the room giving help or feedback as frequently as possible. Descriptions of high- achieving classes suggest that good teachers do this not only to keep students on task, but also to find out as much as they can about how students are doing so they can plan further instruction." (Fisher, et al., 1981, p. 12)

"The (elementary) teacher must devise some workable system using different settings (groupwork, seatwork) for different students in different content areas at different times during the day, and keep the whole system adaptable to changes in student needs during the year." (Fisher, et al., 1981, p. 14)

OBJECTIVE: The preservice student teacher will become aware of opportunities for his/her pupils to take responsibilities in:

- group work
- use of classroom and school facilities
- leadership roles
- individual accountability

Research Findings Indicate:

". . . cooperative reward structures are associated with greater performance than are competitive and independent reward structures when the group task is an independent one (i.e., could not be performed by a single individual), but are associated with less performance when the task does not require coordination of efforts." (Slavin, 1977, p. 635)

". . . cooperative teams have positive effects on achievement, especially when instruction is carefully structured, individuals are accountable for performance, and a well-defined group reward system is used." (Doyle, 1986, p. 405)

"For low level learning outcomes, such as knowledge, calculation, and application of principles, cooperative learning techniques appear to be more effective than traditional techniques to the degree they use:

a.) A structured, focused, schedule of instruction;

b.) Individual accountability for performance among team members;

c.) A well-defined reward system, including rewards or recognition for successful groups.

For high level cognitive learning outcomes, such as identifying concepts, analysis of problems, judgment, and evaluation, less structured cooperative techniques that involve high student autonomy and participation in decision-making may be more effective than traditional individualistic techniques." (Slavin, 1980, p. 337)

"Reviews of research on cooperative learning present convincing evidence that cooperative learning in various game and team contexts can lead to higher achievement, improved cross-race and cross-sex interaction, as well as improved attitudes toward school." (Dickson, 1982, p. 146)

OBJECTIVE: The preservice student teacher develops a workable knowledge of questioning technique that includes:

- using substantive, higher level questions focusing on objectives
- allowing wait time for responses
- listening to student responses for guidance in developing the following questions
- questioning naturally versus the reading of questions to students
- responding to answers that are wrong or not focused on the topic

OBJECTIVE: The preservice student teacher becomes aware of the differences in behavior some teachers show between high and low achievers accordingly in regards to:

- teacher expectations

- wait time
- limiting higher level questions to high achievers
- giving praise versus giving criticism
- use of non-verbal behavior

Research Findings Indicate:

"Teachers ask questions that, more often than not, call for remembered information; they ask many questions and give students little time to answer." (Cuban, 1984, p. 672)

"Gains in achievement can be expected when more higher cognitive than lower cognitive questions are used during instruction." (Redfield & Rousseau, 1981, p. 244)

"Planning and developing a potential sequence of key questions and activities that ask students to focus their thinking in a specific direction establish a framework for the kinds of verbal behavior the teacher will perform in actually teaching the lesson." (Tinsley, 1973, p. 710)

"Clearly expressed and transmitted questions reduce the possibility of student confusion and frustration. If the question does not specify the conditions to which students are to respond, time is wasted attempting to determine what the teacher is expecting." (Wilen & Clegg, 1986, p. 154)

"Effective teachers encourage students to respond in some way to each question asked. This established the expectation that the teacher wants students to reflect and respond to questions. Probing can be used to get a minimum response and

unanswered questions can be redirected to other students." [Brophy & Good, 1985; Weil & Murphy, 1982] (in Wilen & Clegg, 1986, p. 156)

"Effective teachers allow 3-5 seconds of wait time after asking a question before requesting a response, particularly when higher cognitive level questions are asked." [Berliner, 1984; Brophy & Good, 1985; Weil & Murphy, 1982] (in Wilen & Clegg, 1986, p. 156)

Given increased teacher wait-time for student responses several benefits were noted:

a.) The length of student responses increased
b.) The number of unsolicited but appropriate student responses increased
c.) Failures to respond decrease
d.) Teacher-centered show and tell decreases and student-student comparing increases
e.) The number of questions asked by children increased
f.) Slow student contributions increased
g.) Teacher expectations for performance of certain children seem to become more positive (in Rowe, 1974, pp. 89-91)

When the amount of wait-time given, on the average, was examined, it was found that the students the teachers considered to be achievers got nearly two seconds to begin an answer while those seen as low achievers got slightly less than one second (0.9 seconds). (in Rowe, 1974, p. 84)

"A clear teacher expectation pattern develops early in the history of each classroom. Differences in the wait-time and reward patterns administered to children ranked at the top as compared with those at the bottom suggest that teachers unconsciously acted in such a way as to confirm their expectations." (in Rowe, 1974, p. 84)

"The pupils ranked at the bottom actually received more overt verbal praise than did those ranked at the top, but it was difficult to know with certainty what was being rewarded. Top ranked pupils received relatively less evaluative comment from their teachers but the rewards were usually more pertinent to the responses made. Those at the bottom gathered more praise but its intent was far more ambiguous. It appeared that teachers rewarded top groups for correct responses but they rewarded the bottom groups for both correct and incorrect responses." (in Rowe, 1974, p. 84)

OBJECTIVE: The preservice student teacher uses self-evaluation techniques to:

- assess personal strengths and weaknesses
- make lesson revisions and "think on his/her feet"
- reflect on and show a perceptiveness of teacher performance

Research Findings Indicate:

"Reflection is nothing other than internal deliberation, that is to say, a discussion which is conducted with oneself, just as it might be conducted with real interlocutors or opponents. One could say then that reflection is internalized social discussion." (Piaget, 1967, p. 40)

". . .to change teachers need the opportunity to evaluate not only their visible behavior but also their intellectual routines. . ." (McKibbin, 1978-1979, p. 80)

"We assume that teachers can learn from reflecting upon experience, and it seems possible that this type of learning could be related to teaching effectiveness. That is, teachers who reflect more on their teaching may learn more about teaching; by incorporating these deliberations into their planning activities, they may therefore improve their teaching more rapidly." (Morine, 1976, p. 4)

"What really are the relationships between a teacher's thoughts/actions and pupils learning? I believe we can all identify with the teacher in the classroom as he questions his own thoughts, instructional decisions and actions almost immediately. How many times have you mentally congratulated or second guessed yourself--I made the right move or where was the congruency between thought and action, translated to say, I could kick myself for doing that." (Marks, 1978-1979, p. 5)

With these objectives clearly defined and the research selected,we move now to the implementation phase.

Implementation Phase

To achieve these objectives for our pre-service student teachers, a series of learning experiences was planned. Warner's (1985) "research on teacher thinking suggests that teacher behavior is a by-product of information processing strategies which enable teachers to read effectively the classroom environment" (p. 55). Shulman and Elstein (1973) contend that for teachers, the raw information provided by the complexities of the classroom "far exceed(s) the capabilities or capacities of any human

. . ." 3). Newelland Simon (1972) state people learn to process information in direct relationship to the purposes of their task environment. As experiences become more consistent and more predictable information can be processed with fewer task-oriented categories. Doyle (1976) asserts that these units are schematized to reflect the "event structures of the classroom" (p. 63). He states:

"Once formulated, a classroom schema enables a teacher to understand the environment, that is, recognize and interpret events and novel instances and predict possible states and directions of activities. A knowledgeable teacher can, therefore, manage a classroom with a minimum of information cues. Without this understanding, the classroom remains a mass of confusion and complexity (emphasis added) (pp. 63-64)."

To lessen the confusion and complexity, a series of videotapes of classroom scenes was developed for cognitive discrimination training prior to the time when preservice students go into classrooms for practicum experiences.

Videotapes.

An example of the videotapes developed deals with rules/procedures and teacher presence described below.

TEACHER AS CLASSROOM LEADER

Scene One. A child has come home from school and is telling his dad about a problem. He is worried that he will "get into trouble" because his teacher has not told the class her rules and "since all teachers have rules," he is sure he will break

one.

Scene Two. After a brief introduction to the tape, the scene switches to an interview by a pre-service student of two experienced teachers. The inservice teachers describe the importance of establishing clear, concise, and positively-stated rules.

Scene Three. A similar discussion among four experienced teachers follows.

Scene Four. A third grade classroom where students are developing their rules for their classroom on the beginning day of school. The teacher demonstrates an effective presence in the classroom, being sensitive to student responses. Preservice students will read and discuss the research findings as cited earlier in the report.

A Classroom Analysis Form containing questions that will force the preservice students to analyze the classroom events is completed after the viewing of the videotape.

Vignettes.

Not all of the objectives for classroom analysis can be met by the use of videotapes. Descriptive vignettes that present classroom problem situations have been developed for use in the laboratory practicum settings. The content of the vignettes is once again organized around the problem areas. The vignettes present the problem situation and then several possible solutions. The preservice students analyze the situations and solutions and determine which of the solutions they will choose to solve the problem. An example of the vignettes follows:

Mr. Sanchez has just finished a math lesson in which he introduced the concept of multiplication to his third grade class. Half the class is working earnestly on their seatwork, which is a ditto on which they must list multiples of the numbers two through ten. The other half of the class is standing in a line in front of Mr. Sanchez with pained and quizzical expressions on their faces. He is patiently trying to deal with each individual child, but at this rate he will never finish before P.E. The students at his desk are becoming disruptive and are distracting the children doing their seatwork.

There seem to be two basic groups in this situation. One group needs further help, while the other group seems to be having no trouble with the concept. The teacher is also under a time constraint.

Solution 1.

The teacher asks all the children to be seated. He assumes that if the majority of the students need help, then the whole class would benefit from it. He asks for the whole class' attention. The class then becomes involved in a re-teaching activity which involves doing the worksheet together. The students who are already working on the seatwork have become restless and want to call out the answers before the other students have time to think. Time comes for the class to go to P.E. The assignment is finished. The teacher takes up the papers to check on student progress.

Solution 2.

The teacher notices that there are almost as many children who need help as

those who are working on the papers. He asks those in line to find a partner who is sitting at their desk. He asks the students who understand their seatwork to answer their friend's questions. A peer tutoring situation is set up. The teacher walks around the room monitoring the progress of the students. When a child understands the assignment, he is asked to go to his seat and try it again on his own.

Solution 3.

The teacher recognizes that the students in line are asking generally the same questions. He then asks them to bring their chairs and put them in a circle at the front of the room. He then asks them to put away their worksheets and pencils. He begins to re-teach the lesson at a slower pace. Many questions are asked of the children. When the teacher is satisfied with the number of children who are answering the questions correctly, he re-explains the worksheet, asks for questions and sends them back to their desks.

Concerns of the Teacher:

1.) Helping students master their assigned math skill

2.) Giving individual help to those in need of it

3.) Using limited classroom time efficiently

4.) Involving all students in meaningful time on task

5.) Maintaining classroom order

Areas of Concern of Student Teachers Which Are Involved in this Problem:

1.) Awareness of the class

2.) Designing lessons which flow smoothly

3.) Using seatwork wisely

4.) Allowing students to assume responsibilities

Just as the preservice students use a Classroom Analysis Form with the videotapes, they do the same for the vignettes.

Computer Simulations.

In the computer simulation version of the vignettes, the vignette is presented in a textual manner followed by the various solutions. Students are able to move from the situation to the various solutions so that re-reading and study of the situation and various solutions is possible even if the text takes more than one computer screen. Students are asked to pick a solution and the computer program will give them feedback on their choice. If the solution is the best one the student not only sees a reinforcement statement but also the research results that support this solution. If a less effective solution is chosen, the student receives information about why this alternative is not as appropriate again based upon the research. The program monitors student performance and provides the instructor with a summary of each student's progress.

An interactive videodisc is currently being developed using segments of videotaped classroom situations. The content of the videodisc presents a teacher utilizing three different approaches to small group work - ability, interest and cooperative grouping. Students will be presented with the problem of identifying the strengths and weaknesses of each of the grouping strategies. Available on the disc will be experts discussing what they see as the strengths and weaknesses that students can use for verification of their responses.

Another part of the disc presents a disruptive student situation in the classroom. Different possible solutions to the problem are presented. Students make a choice among the solutions and then have the opportunity of seeing what the outcome of that choice will be.

Preservice Student As Researcher.

"When teachers adopt a researcher's frame of mind, teaching improves. Through participation in research, teachers learn more about teaching. They learn how to look beyond--without overlooking--the immediate, the individual, and the concrete" (Watts, 1985, p.126). The quote refers to inservice teachers, but it stands to reason that preservice teachers should benefit from such experience as well. Research techniques, particularly qualitative methods such as participant observer are presented to the preservice teachers in their first practicum courses. A process of identifying questions and doing mini-research projects in the classroom occurs during their practicum experiences and culminates in a research project during their senior year in student teaching. Each time they develop a more sophisticated ethnographic research study. Some examples of the research questions are "Do I call on all children in the classroom or just a few?" "How do I respond to the children's responses?" "What levels of questions do I ask?"

Self-Monitoring Activities.

"The ability to predict or to estimate task difficulty, to self-interrogate, self-test, or monitor the use of a strategy to task demands, and to make use of implicit and explicit feedback must come to underlie the education of teachers" (Meichenbaum and Asarnow, 1979, p. 29).

"Self-interrogation concerning the state of one's own knowledge during problem solving is an essential skill in a wide variety of situations, those of the laboratory; the school or everyday life." (Brown and DeLoache, 1978, p. 61). Student teachers and practicum students are encouraged to monitor lessons and self-interrogate aspects of their own teaching. Preservice practicum students self-monitor their peer teaching, micro-teaching and teaching of lessons in the classroom. They use a series of questions to guide their reflective thoughts.

Upon completion of lessons taught by the practicum student and student teacher and observed by the university supervisor, they are asked to respond to the following questions:

1) What things went well with the lesson you just taught?

2) What things would you change about the lesson you just taught?

3) What revisions did you make in your original plan for the lesson?

4) What are your teaching goals for your next lesson?

In addition to the questions outlined above, practicum students and student teachers are encouraged to self-evaluate all lessons they teach (rather than only those

that are observed). A component of each lesson plan is a critique section.

Analysis of the Classroom: Student Teaching Seminars.

As a result of the program development a change in the student teaching experiences was initiated. The early introduction to the classroom is balanced with seminars utilized to present research data and the further development of analytical skills. Seminars are planned for student teachers to analyze the observation data they collect in the classroom. Student teachers spend the mornings of the first week of each of the two student teaching placements observing and becoming a part of the classroom. Afternoons are spent on campus in a seminar designed to meet the following purposes:

1.) "Bridge the gap" between university coursework/expectations and the public school classroom;

2.) Formally analyze the elementary classroom;

3.) Connect research findings to practice;

4.) Prepare for taking on the role of teacher in these classrooms'

5.) Establish a model for problem solving and conceptual development for future teaching.

Practicum Handbook and Notebook

Another activity implemented is the handbook for practicum students. The handbook includes procedures and policies of the practicum, but, additionally, provides for problem solving. Students use observation questions for their initial visits to the classroom. They have research articles to read and then relate them to their practicum experiences.

Looking Back Phase

Experts on problem solving say the "looking back" phase is one of the most important and oft neglected. It is the act of looking back, reflecting, evaluating, generalizing both the problem and the solution, and relating the problem to others that incorporate the problem into the repertoire of solved problems and moves the solver to a higher level of competence.

Field Support Team.

One of the most important aspects of looking back was to assess the input of the Field Support Team. The members of the Field Support Team were interviewed to determine the degree to which they thought their participation in the program development was beneficial. The questions which made up the interview were designed to elicit responses which would reveal the participants' opinions of the most important aspects of the program. Questions included those which asked about the role of the Field Support Team in program development, the individual's role in that team, the activities in which the team engaged, and the format of the Field Support Team meetings. Those interviewed were also given an opportunity to express their opinions

about the program and give suggestions of activities that the Field Support Team could be involved in during the continued program development.

The general consensus of the teachers was that their role in the program development was to share the perspective of the practicing classroom teacher with those who are designing preservice teacher education programs. The teachers felt that student teachers need to be educated in programs that combine educational theory with the "real" world of the day-to-day elementary classroom. One teacher ventured that the participation of classroom teachers in designing preservice teacher education programs gave "validity to the proceedings."

Many of the teachers stressed that their participation on the Field Support Team helped them grow professionally. Involvement of the team's activities encouraged the teachers to analyze their classroom teaching and their work with preservice teachers. The seminars provided these master teachers with professional adult contact and exposure to some of the research findings that had been published since their last coursework was completed. The results of this kind of involvement included "more interest in day-to-day teaching" and the desire to "analyze the effects of various teacher behaviors" in classroom settings. The teachers also acknowledge receiving some needed positive feedback from the seminars. They found that many of their personal teaching methods were supported by research and by their peers.

Participation in the team gave the teachers a clearer view of the roles of practicum and student teaching in the teacher education process at Peabody/Vanderbilt. One teacher summarized this by stating, "It made me understand better what the student teacher had to accomplish. It was good to find specific things that a student teacher might need help with. I had never thought about helping with specific areas before."

The majority of the teachers did not think their actual work with practicum or student teaches had changed. However, several participants did mention that they felt

they were now better equipped to guide the student teachers through their experience with the use of the "growth area objectives" presented to them. Two of the teachers asserted that they would now begin to give their undergraduate charges more control of the classroom sooner. On the whole, the Field Support Team thought the experience gave them a better understanding of the role field experiences play in preservice teacher education, the specific needs of preservice teachers, and ways they can help their student teachers and practicum students become better teachers.

Preservice Student Teachers As Problem Solvers

To determine the achievement of the objectives with the preservice student teachers and to assess their problem solving abilities, several evaluative techniques are being used. Practicum students are given pre- and post vignettes as evaluative measures for determining the success of the videotape and vignette experiences.

The baseline data that were collected through formal and informal/narrative evaluations for determining the problem areas (now defined as objectives) are being compared with the same type of data collected on the preservice student teachers who have had the revised program experiences.

An observation instrument including the items listed in the objectives is used to evaluate the classroom behaviors of the practicum students. These observation forms were used to rate the student behavior in a teaching situation in the classroom. Each student was observed three times. The mean scores for those observations are presented in Appendix A.

During the first week of the student teachers' final placement, pre- service students observe their cooperating teachers for a one-hour block of time. This observation is structured to focus on classroom management and organization. Narrative notes are recorded during the observation. Student teachers describe the

following aspects of the observation:

1.) The teacher's tasks observed during the hour.

2.) All "moment-to-moment" decisions the teacher made as perceived by the student teacher.

3.) Identification of any student behavior that required prior management instruction on the teacher's part.

4.) A description of the overall management procedures which seemed to be in place in the classroom.

These observations are used to identify student teachers' awareness of ways that classroom teachers address the problem areas (objectives) that have been identified.

Conclusions

The use of the problem solving model in redesigning the teacher preparation program was invaluable. By focusing on the problem areas of the preservice students, only changes that would alleviate those problems were initially made.

Reviewing the research and utilizing it with both preservice and inservice teachers gave them the opportunity to analyze their classroom behaviors relative to the research findings. Preservice students began to ask the question "What does the research say?" when faced with a problem situation while the inservice teachers (Field Support Team) reaffirmed some of their teaching behaviors.

Technology presented us with some problems. Videotaping classroom scenes is a

difficult task. Noise, outside distractions, and the attempt to avoid class disruption often prevent accurate recording of the instruction and management. However, we have found our efforts to be well worth the difficulties. The outcomes are most useful when providing preservice teachers with classroom experiences and opportunities to solve problems within those settings. The visual descriptions of the problems facilitate for students an understanding of research implications. The computer simulations have not proved as effective as we had hoped since the students expressed the belief that the written vignettes were all that were needed.

Based on the previous experience using the computer simulation, a new format for the computer simulation was developed. In the new format, an attempt was made to link relevant research more closely to the alternative strategies to solving the classroom problem presented in the vignette. The new format was also designed to ensure that the practicum students would study each alternative strategy more carefully and think more critically about the positive and negative aspects of each alternative strategy.

To determine whether the new format offered an improvement over the original format, practicum students in the winter semester 1988 worked with each of the computer simulation formats on two successive class sessions. Discussion with the students who had used the computer simulation using both formats suggested that the new format did achieve the goal of encouraging stronger critical thinking by the students. The videodisc should offer more realistic impressions of the classroom with its visual dimension.

As a result of the changes made in the teacher education program, the preservice teachers are more self confident, more able to solve problems and make decisions in the classroom, more respectful of the research and its value to their classroom behaviors, and overall more effective as teachers.

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APPENDIX A

PRACTICUM OBSERVATION FORM

Name MEAN SCORES FOR FINAL EVALUATION OF PRACTICUM STUDENTS

School _____

Subject _____ Grade _____

Type of Instruction _____

Rating Scale Low High						Objectives
						Awareness of the Class
1	2	3	4	5	4.4	Recognizes off-task behavior
1	2	3	4	5	4.3	Awareness of pupils in all sections of classroom
1	2	3	4	5	4.7	Develops ways of addressing all pupils
					4.6	Ability to use rules in the classroom
1	2	3	4	5		Makes pupils aware of the rules
1	2	3	4	5	4.5	Monitors the rules and uses consistent enforcement of them
1	2	3	4	5	4.4	Uses a variety of strategies to deal with disruptive pupil behavior
						Effective use of personality in the classroom
1	2	3	4	5	4.8	Assumes a "teacher presence" in the classroom
1	2	3	4	5	4.5	Shows enthusiasm for teaching and children
1	2	3	4	5	4.5	Uses a variety of expressions and voice inflections
1	2	3	4	5	4.0	Makes use of non-verbal expressions
1	2	3	4	5	4.4	Sensitiveness
1	2	3	4	5	4.8	Dresses professionally
						Reaction to Student Responses
1	2	3	4	5	4.7	Listens actively
1	2	3	4	5	4.6	Talks with students, not at them
1	2	3	4	5	4.8	Uses language appropriate for grade level

1 2 3 4 5	4.4	Knowlege of Questioning Technique Uses substantive, higher level questions focusing on objectives
1 2 3 4 5	4.6	Allows wait time for responses
1 2 3 4 5	4.0	Listens to student responses for guidance in developing the following questions
1 2 3 4 5	4.6	Ability to design and teach lessons Paces the lessons
1 2 3 4 5	4.6	Integrates content and management
1 2 3 4 5	4.8	Progresses the lesson logically
1 2 3 4 5		Justifies the time spent on each aspect of the lesson
1 2 3 4 5	4.5	Introduces the lesson effectively
1 2 3 4 5	4.7	Provides appropriate closure
1 2 3 4 5	4.3	Deals with interruptions in a manner that minimizes the loss of instructional time

Comments: